

**Project Number**

BDV30-977-09

Project Manager

Jeff Morgan

*FDOT Traffic Engineering and
Operations Office***Principal Investigator**

Bruce Harvey

Florida State University

Florida Department of Transportation Research

Damage to ITS, Traffic Control and Roadway Lighting Equipment from Transient Surge and Lightning Strikes

*December 2016***Current Situation**

Certain areas of Florida experience some of the highest densities of lightning strikes in the U.S. This has serious implications for the many electrical installations which the Florida Department of Transportation (FDOT) maintains along state roadways. These installations, such as ITS, traffic control and roadway lighting, are vital to the safe and efficient operation of the roadway system. Ensuring adequate protection from lightning strikes is crucial to maintaining their function.

Research Objectives

In this comprehensive study, Florida State University researchers developed guidance for FDOT to improve existing standards for surge protection used in these installations and also improve roadside equipment installation procedures.

Project Activities

In the first of three tasks, the researchers reviewed the state of current practice among departments of transportation regarding lightning and surge protection. They summarized the findings and recommendations of similar studies of surge protection devices (SPD) as found in the scientific literature and identified relevant standards among the many available for surge protection.

Also, in the first task, the researchers identified the current state of practice in Florida by examining both published standards and records of actual lightning incidents affecting FDOT equipment (both failures and successful protections). Extending their review of Florida practice, the researchers surveyed other southeastern states, receiving responses from Alabama, Louisiana, Mississippi, Tennessee, and Texas.

In the second task, the researchers identified and reviewed all the elements of a monitoring program. This included examination of the standard for testing SPDs and reviews of testing equipment, laboratory standards and testing procedures, and site monitoring tools and methods. Best practices used outside Florida and other industry standards used to protect similar equipment were also reviewed.

The first two tasks focused on preventing damage to FDOT equipment caused by electrical surges resulting from nearby lightning strikes. In the final task, the researchers addressed prevention of direct lightning strikes through the use of metal devices (lightning rods) that intercept electrical energy and direct it to the ground. This topic has been studied extensively. The researchers reviewed the current state and identified best practices.

A series of summary recommendations were made for equipment and test procedures for an SPD laboratory, and for a standard template to be used statewide for the maintenance of roadside electronic devices used at ITS, traffic control and roadway lighting installations.

Project Benefits

The results of this project will assist FDOT in protecting its electronic transportation infrastructure, thus minimizing impacts on Florida roadways and reducing maintenance and replacement costs.

For more information, please see dot.state.fl.us/research-center.



Lightning is a frequent threat to structures in Florida.